Status of the GLAST Science Support Center

David Band – Science Lead, SSC

Jay Norris – SSC Manager

Status

- No change in SSC membership since last meeting.
- Little change in the PDMP. Future revisions will reflect a better understanding of the telemetry and ground system, and changes to the data policy.
- With the choice of a MOC and the development of the ground system we can focus on our operations.
- We have decided to incorporate our operations-oriented PDR and CDR into the ground system PDR and CDR. We will schedule a review of our science functions (e.g., the GI program, support for investigators) ~1 year before launch.
- The SSC-LAT software working group meets nearly every week by VRVS. Our role in defining the standard analysis environment is nearly complete; details will be given in the next talk.

Structure

- SSC members have been assuming lead roles on various SSC functions (e.g., data ingest, computer security).
- We have formalized the resulting structure by categorizing these roles into 4 areas:
  - External interfaces: operations involving other organizations. Includes timeline, command passing and data ingest.
  - Internal systems: our computer system, computer security.
  - Software systems: development of the various tools.
  - Information systems: our website and the information it will serve to the community, the GI program, our schedule

SSC Software

- **LAT Standard Analysis Environment (SAE): Suite of science analysis tools defined jointly by the LAT team and the SSC, development managed by the LAT team with SSC participation. The tools are described in the next talk.**

- **GBM Tools:**
  - **Tools in the LAT SAE--tools for burst analysis (e.g., event binning, spectral fitting) that are part of the LAT SAE will also be able to analyze GBM data (separately or jointly with LAT data)**
  - **DRM generator--creates the DRM (detector response matrix) for the GBM data, to be supplied by the GBM team.**
  - **Background creation--calculates a background for the GBM data.**

SSC Software, Cont.

- **GI Preparation Tools:**
  - **Observation simulation--use the simulation tools in the SAE, perhaps with simplified response functions.**
  - **Orbit simulation**

- **SSC Pipeline:**
  - **Exposure--calculates exposure maps over a specified time range, posts maps on SSC website**
  - **Lightcurve monitoring--runs the likelihood tool (from the SAE) on a set of bright sources (e.g., 3C279).**
  - **Backup LAT Level 1 processing pipeline**
  - **Database software (Reformatting data; Metadata creation; Data Loading; Database testing; Beowulf software)**
  - **Web cgi programs (Posting timelines, Access to data; Access to point source catalog; Access to burst catalog)**

SSC Software, Cont.

- **Operations Tools:**
  - **Existing tools (TBR)**
    - **ITOS--commands processing**
    - **TAKO--mission timeline**
    - **DTS--data transfer to and from SSC**
  - **Miscellaneous operations tools for transferring mission activity schedules, commands from IOCs to MOC, etc.**
  - **Orbit Simulator--to be used for studying observing strategy, planning timeline, and guest investigator support**
  - **Analysis software installation tools**
  - **Process Manager--watchdog for operations programs (to be adapted from RXTE version)**

SSC Involvement in LAT Science Tools

- Most discussion of the LAT science tools will be treated in the next presentation. Here we present SSC-related details.
- Masa Hirayama is the "manager" for pulsar tools. He is investigating which existing tools can be used for different steps of the pulsar analysis. See http://glast.gsfc.nasa.gov/ssc/dev/psr_tools/
- Bob Schaefer is the "manager" for database utilities. See http://glast.gsfc.nasa.gov/ssc/dev/db_utils/
- David Band is the "manager" for gamma-ray burst tools. We plan to use XSPEC for standard spectral fitting. See http://glast.gsfc.nasa.gov/ssc/dev/grb_tools/
- Sandhia Bansal converted David Band's IDL prototype for an event binning tool into a C++ FTOOL, and incorporated Jay Norris and Jeff Scargle's Bayesian Block time binning.
- Jim Chiang has developed a likelihood analysis prototype.

LAT Science Tools, Cont.

- SSC programmers and scientists are working on formal object-oriented designs of a number of tools.
- Yasushi Ikebe is investigating the traditional X-ray astrophysics technique of extracting and fitting 1D count spectra from sources in a region of interest. This method may be particularly useful for analyzing strong sources with multimission data.
- Bob Schaefer and Dave Davis have been experimenting with different architectures for the event database. A Beowulf is fastest, but all methods are sufficient (without invoking Moore's Law!).
- Yasushi Ikebe and Dave Davis have concluded that inserting EGRET data and IRFs into the GLAST system is feasible with available resources.
- Chunhui Pan and Bob Schaefer have been evaluating graphics packages.

Other Accomplishments

- The SSC Functional Requirements Document has finally been baselined!
- The HEASARC-SSC MOU is nearly complete; Swift's is the model.
- Dave Davis and Bob Schaefer have a preliminary design of our computer system. Masa Hirayama is investigating the computer security issues and certifications for this design.
- Jay Norris and Jerry Bonnell have been working on the temporal-spatial LAT burst trigger.
- Dirk Petry has a preliminary SSC website designed. For communications within SSC and with collaborators we have development websites.

Plans for the Immediate Future

- Support science tools development
  - Finalize formulation.
  - Refine definition of the tool suite.
  - Design the tool architecture.
  - Develop tools!
- Design SSC operations: define/identify tools (e.g., timeline scheduling, command passing); design computer architecture; negotiate interfaces with other elements of the ground system; and participate in writing ground system documents.
- Documents
  - IRD, ICDs, MOUs between SSC and IOCs, MOC
  - Software requirement documents

Additional Slides

Members of the SSC

The following are present full and part-time SSC members

- Jay Norris—manager
- David Band—science lead
- Dave Davis—databases
- Yasushi Ikebe—calibrations
- Masaharu Hirayama—LAT scientist
- Dirk Petry—user services
- Jim Chiang—ambassador to LIOC
- Valerie Connaughton—GBM scientist, ambassador to GIOC
- Jerry Bonnell—GRBs/PR
- Bob Schaefer—databases
- Cathie Meetre (part time)—operations
- Robin Corbet (part time)—operations
- Sandhia Bansal—programmer
- Chunhui Pan—programmer
- Sandy Barnes—administrator
- JD Myers (part time)—webmaster